

IN THE CLAIMS:

Cancel claims 1-8 and insert the following claims:

65 9. (New) An apparatus for subjecting a fluid to irradiation by high intensity ultrasound, the apparatus comprising a generally cylindrical vessel, and a multiplicity of ultrasonic transducers attached to a wall of the vessel in an array that extends both circumferentially and longitudinally for radiating ultrasonic waves at a frequency above 10 kHz into a fluid in the vessel, characterized by the vessel being large enough that each transducer radiates into fluid at least 0.1 m thick, each transducer being connected to a signal generator arranged so the transducer radiates no more than 3 W/cm², the transducers being sufficiently close to each other, and the number of transducers being sufficiently high, that the power dissipation within the vessel is at least 25 W/liter but no more than 150 W/liter.

10. (New) An apparatus as claimed in claim 9 wherein the power radiated by each transducer is in the range 1-2 W/cm².

11 (New) An apparatus as claimed in claim 9 wherein the number of transducers, the power of the transducers, and the volume of the vessel are such that the power density is between 40 and 80 W/litre.

12. (New) An apparatus as claimed in claim 9 wherein the vessel is double walled, with an inner wall and an outer wall

with a space between them, the transducers being attached to the outer wall, the fluid to be treated is enclosed within the inner wall, and the space between the two walls is filled by a low attenuation buffer liquid whose cavitation threshold is above that of the liquid to be treated.

13. (New) An apparatus as claimed in claim 9 comprising a plurality of ultrasonic signal generators, each signal generator being arranged to energize a separate group of the transducers.

14. (New) An apparatus as claimed in claim 13 wherein, in each said group, the transducers are adjacent to each other.

15. (New) An apparatus as claimed in claim 13 wherein at least one group of the transducers resonates at a different frequency to other groups of the transducers, and each signal generator is arranged to energize the respective group of the transducers at their resonant frequency.

16. (New) An apparatus as claimed in claim 14 wherein at least one group of the transducers resonates at a different frequency to other groups of the transducers, and each signal generator is arranged to energize the respective group of the transducers at their resonant frequency.

17. (New) A method for subjecting a fluid to irradiation by high intensity ultrasound, said method comprising the steps of:
selecting a generally cylindrical vessel having a diameter greater than 0,1 m;

attaching a multiplicity of ultrasonic transducers to the wall of the vessel in an array that extends both circumferentially and longitudinally;

enclosing the fluid within the vessel;

connecting each transducer to a signal generator, and

energizing the transducers so that ultrasonic waves at a frequency above 10 kHz are radiated into the fluid within the vessel,

the improvement wherein each transducer is arranged to radiate at a power intensity adjacent to the wall no more than 3 W/cm², and wherein the transducers are sufficiently close to each other, and the number of transducers are sufficiently high, that the power dissipation within the vessel is at least 25 W/litre but no more than 150 W/litre.

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18. (New) A method as claimed in claim 17 wherein the power radiated by each transducer is in the range 1-2 W/cm².

19. (New) A method as claimed in claim 17 wherein the number of transducers, the power of the transducers, and the volume of the vessel are such that the power density is between 40 and 80 W/litre.

20. (New) A method as claimed in claim 17 wherein the vessel is double walled, with an inner wall and an outer wall with a space between them, the transducers being attached to the outer wall, the fluid to be treated is enclosed within the inner

wall, and the space between the two walls is filled by a low attenuation buffer liquid whose cavitation threshold is above that of the liquid to be treated.

21. (New) A method as claimed in claim 17 including the step of providing a plurality of ultrasonic signal generators, each signal generator being arranged to energize a separate group of the transducers.

22. (New) A method as claimed in claim 21 wherein, in each said group, the transducers are adjacent to each other.

23. (New) A method as claimed in claim 21 wherein at least one group of the transducers resonates at a different frequency to other groups of the transducers, and each signal generator is arranged to energize the respective group of the transducers at their resonant frequency.

24. (New) An apparatus as claimed in claim 22 wherein at least one group of the transducers resonates at a different frequency to other groups of the transducers, and each signal generator is arranged to energize the respective group of the transducers at their resonant frequency.

IN THE ABSTRACT:

Add the attached Abstract following the last page of the specification.

Please insert the following new HEADINGS in the
specification:

~~B6~~ Page 1, after line 5, insert ~~/~~ BACKGROUND OF THE INVENTION--.

~~B7~~ Page 2, after line 10, insert ~~/~~ SUMMARY OF THE INVENTION--.

~~B8~~ Page 4, after line 18, insert ~~/~~ BRIEF DESCRIPTION OF THE
DRAWINGS--.

~~B9~~ Page 5, before line 1, insert ~~/~~ DETAILED DESCRIPTION OF THE
INVENTION--.